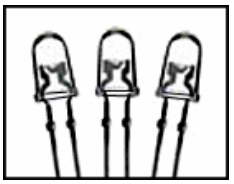
Physics: 15. Electronics

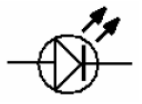
Exam questions

Diodes and Light Emitting Diodes

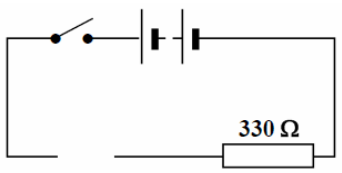


1. [2008]
   Identify the devices shown in the diagram.

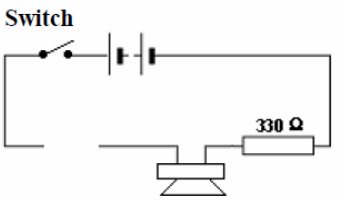
2. [2008]
   Leds are often used instead of bulbs. Give a reason for this wide application.



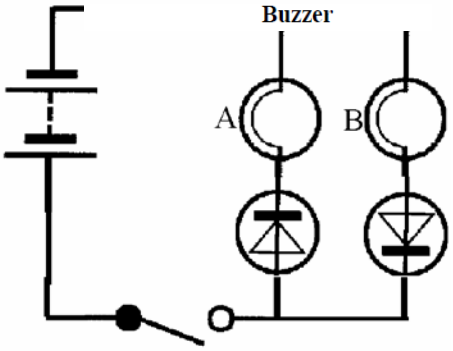
3. [2006 OL]
   The diagram shows the symbol of a LED.
(i) Complete the circuit on the right by drawing in the LED so that the LED will light when the switch is closed.
(ii) Why is there a resistor connected in series with the LED?



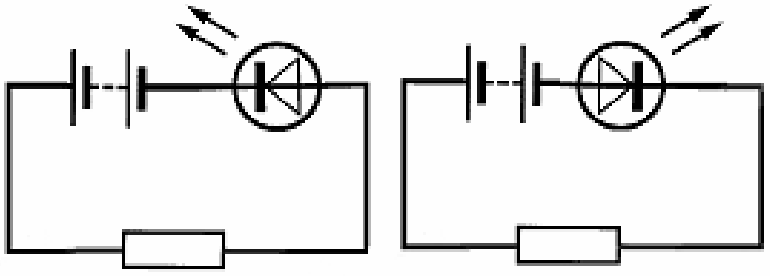
4. [2007 OL]
(i) Identify device labelled A on the right.
(ii) Complete the circuit inserting the symbol for the device A so that the buzzer would sound if the switch were closed.



5. [2007]
(i) Look carefully at the circuit diagram and then state which bulb/s, if any, light when the switch is closed.
(ii) Give a reason for your answer.

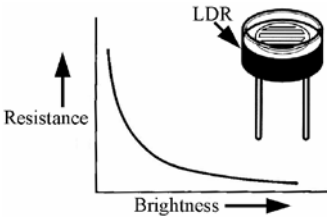


6. [2006]
   A pupil carried out an investigation into the effect of a diode on d.c. and on a.c. circuits using an LED.
   The following circuits were initially set up.
(i) What is observed in circuit A (the first circuit) and in circuit B (the second circuit)?
(ii) When the batteries in circuits A and B were replaced by 6 V a.c. supplies the LEDs glowed dimly in both circuits. Explain this observation.



Light Dependent Resistors

7. [2009]
(i) The diagram shows a light dependent resistor (LDR) and a graph of the resistance of the LDR against the brightness of light falling on it.
   Give an everyday use for an LDR.
(ii) Describe an experiment to measure the resistance of an LDR under varying degrees of brightness of light.



(iii) Draw the circuit diagram in the box provided.
(iv) Explain how you would vary the brightness of the light.
You do not have to state how the brightness of the light was measured.

Exam solutions

Diodes and Light Emitting Diodes

1. Light emitting diodes (leds)
2. They are cheap/ can be switched on and off rapidly without 'blowing'/ long lasting/ fit into small spaces.
3.
(i) Diode inserted in forward bias (i.e. just drop it in without turning it around)
(ii) Protect the led / limit current
4.
(i) A: Diode
(ii) Drop the diode into the circuit as it is (without turning it around).
5.
(i) Bulb A lights
(ii) The diode with A is in forward bias (the + end of diode is connected to + pole of the battery) and so allows current to flow.
6.
(i) The LED in circuit A glows while the LED in circuit B does not glow
(ii) a.c. is alternating current, so for half the time current is flowing in the right direction and the led glows, but for the other half of the cycle the current is flowing in the wrong direction and so the led does not glow..

Light Dependent Resistors

7.
(i) To measure light intensity/ as part of a circuit to switch on (off) lights/ light sensor/ alarms/ street lights/ camera...
(ii) Connect the LDR to a multimeter set to measure resistance.
Note the reading on the ohmmeter when the LDR is at different distances from the light bulb.
(iii) See diagram
(iv) Move light source closer to the LDR and note that the resistance decreases.